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EXAMINER

MENON, KRISHNAN S

ART UNIT	PAPER NUMBER
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1723

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/831,001  
Filing Date: September 19, 2001  
Appellant(s): CUYPERS ET AL.

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Christian E. Schuster  
For Appellant

**EXAMINER'S ANSWER**

**MAILED**

SEP 07 2005

**GROUP 1700**

This is in response to the appeal brief filed 7/27/05.

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**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) *Summary of Claimed Subject Matter***

The summary of claimed subject matter contained in the brief is correct.

**(6) *Grounds for Rejection to be Reviewed on Appeal***

The appellant's statement of the grounds for rejection in the brief is correct.

**(8) *Claims Appealed***

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(9) *Prior Art of Record***

WO 97/49477	SWANBORN	12-1997
4.187,089	HODGSON	02-1980
WO 93/05339	KARLSSON	09-1993

**(10) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

1. Claim 13-21 and 27-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/49477 in view of Hodgson (US 4,187,089).

Claim 13: WO 97/49477 discloses a device for treating a gas/liquid mixture comprising a tube (1 – fig 1) with inlet (A-fig1) and outlet (8-fig 1), rotating means (5-fig 1), outlet openings down-stream of the rotating means for lateral flow of the liquid drops (9-fig 1), an axial return conduit centrally located through the rotating means (12-fig 1), and divergence element in the return conduit (7-fig 1). The flow path of the mixture comprises the flow path as outlined in claim 13 (see figure 1). Re the limitation of the flow to diverge “substantially” laterally: Word substantial means “considerable in quantity” (Webster’s Collegiate Dictionary, 10<sup>th</sup> Ed.), and considerable quantity of flow could diverge from the axial direction from the nozzle 7 of WO’477. See page 4 lines 5-8, where it describes the secondary flow being drawn by the main flow due to the cyclonic action of the main flow, and the main flow is described as “... at least to a considerable extent radially ... together with ... 20% of the gas flow...” in page 3 lines 29-36.

WO’477 does not teach an axial obstruction in the return flow line. Hodgson teaches an axial flow obstruction (44) in a flow line that carries liquid drops in a gas stream – see the figures which would provide a substantially diverging flow from the divergence element with the lateral slots formed between the baffles 46. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of

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Hodgson in the teaching of WO'477 to have the axial conical obstruction to have the gases impinge the obstruction so as to coalesce the liquid droplets in the gas stream, thereby effectively removing the final traces of liquid from the gas stream, as taught by Hodgson (see col 1 lines 45-50).

Re the amendment adding substantially vertical, the primary ref teaches a vertical device. Re the '...substantially prevent liquid creep flow along the rotating means', the WO'477 reference does teach such a divergence element (divergent element ...for...substantially prevent liquid ...; see 7-fig1 and 17-fig 2). Also, the WO'477 as modified by Hodgson would inherently have this effect, even though Hodgson does not teach this aspect.

Claim 14: Divergence element comprises slots in the return conduit – see at 46 of the figures of Hodgson. Space between the baffles are open slots.

Claim 15: The divergence means is a “substantially” conical element extending into the return conduit (Figures of Hodgson).

Claim 16: The outlet openings are a number of longitudinal slots as in instant claim 16 (9-fig 1)

Claims 17 and 18: The rotating means is a swirl element with varying outflow angle (see figure 1).

Claim 19 adds further limitation of the size of the separated droplets, which WO 97/49477 in view of Hodgson does not teach. However, it would be obvious to one of ordinary skill in the art at the time of invention to realize that the separation apparatus

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having similar structure as in the present application would generate similar sized droplets in a gas-liquid separation.

Claims 20 and 21 add further limitations as follows: WO 97/49477 discloses an installation (page 2 line 17- page 3 line 2; fig 1) having a vessel with a supply connections stub (A-fig 1), one or more boxes in which one or more devices for treating gas/liquid mixture is arranged (page 2 line 34 – page 3 line 2) as in instant claims 20 and 21. WO 97/49477 does not describe a liquid drain conduit from the bottom of the vessel as in claim 20. Hodgson teaches a liquid drain from the bottom of the vessel (50,52-fig 1). It would be obvious to one of ordinary skill in the art at the time of invention to provide a drain for the liquid as taught by Hodgson in the teaching of WO'477 for disposing the collected liquid.

Claim 27: limitations in claim 27 are similar to that of claim 13 – see the rejection of claim 13.

Re claims 28-32, the additional limitations are similar to that of claims 14-18, and are described in the rejections of claims 14-18 above.

Claims 33 and 34: conical element is disposed at the end of the conduit in Hodgson - see figures of Hodgson.

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2. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/49477 in view Hodgson (089) as in claim 13 above and further in view of WO 93/05339.

WO 97/49477 in view of Hodgson discloses a device according to claim 13 as described above, with inlet opening for the mixture (A-fig 1), and rotating means for setting the mixture to a rotating motion (5-fig 1) as in instant claim 22.

WO 97/49477 in view of Hodgson does not disclose a conical outlet with 1-30 deg cone angle as in instant claim 22 and 23 or an additional tube part as in instant claim 24. WO 93/05339 teaches such a conical outlet (3, fig 1) and an additional tube part (9-fig 1) in the outlet of a similar liquid-gas mixture separation device. It would be obvious to one of ordinary skill in the art at the time of invention to use the teachings of WO 93/05339 in the teachings of WO 97/49477 in view of Hodgson to make the outlet end conical with the additional tube part because it would decrease the carry over of the liquid droplets in the gas stream as taught by WO 93/05339 (lines 20-37, page 10)

**(11) Response to Argument**

I. Obviousness Rejection of Claims 13-21 and 27-34 over WO 97/49477 in view of Hodgson'089:

Appellant's independent claims 13, 20 and 27 are for a gas-liquid separation device or installation. The primary reference WO 97/49477 teaches the device as claimed, except for a modification on the tip (7, figure 1 or 17-figure 2: flared end of the conduit) of the return (recycle) conduit (12). The modification claimed is an axial

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obstruction in the reintroduced flow path. The structure corresponding to the axial obstruction is an inverted cone at the tip of the tube as depicted in Appellant's figure 3, part 10; the slots around the conduit at (10) providing the diverging flow path. The secondary reference Hodgson teaches similar structure for a gas-liquid separator in figure 1, details of which is shown in figure 2. Cone 44, with the openings (slots) between the baffle members 46, at the end of the tube in Hodgson help to coalesce any remaining droplets in the gas stream – see column 1 lines 45-54. Therefore, it would be obvious to one of ordinary skill in the art to use this construction of Hodgson to modify the WO 97/49477 reference. One of ordinary skill in the art would be motivated to combine the references because of the teaching of Hodgson that this arrangement of the cone and slots at the tip of the tube would help coalesce the remaining droplets of liquid. It may also be noted that impingement and coalescing of entrained liquid on a suitable obstruction placed in the flow path is "commonly employed" or known in the art according to Hodgson (column 1 lines 15-21). In addition, Appellant admits that (page 13; bottom paragraph of the brief) the recycle flow entering the main flow inevitably include a significant percentage of liquid. One of ordinary skill in the art would readily recognize this problem and it would motivate one to combine WO'477 with Hodgson to remove the liquid in the recycle flow (as opposed to the creep flow, which is the liquid contained in the main flow creeping on the surface of the swirl elements (rotating means)) by providing the conical impingement baffle

In response to the appellant's argument that Appellant's claimed device has substantially laterally divergent flow exiting slots (19) blows off the liquid creep flow on



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the swirl element, whereas the WO 94/49477 will have no effect on the axially discharging recycle flow (page 14 of the brief, top paragraph): step d) of independent claims 13, 20 and 27 recite a divergence element at the end of the return conduit; WO'477 teaches such a divergence element at 7, figure 1 or 17, figure 2, and WO'477 intended this structure for preventing creep flow (lines 9-20, page 4). Thus preventing the creep flow is already addressed by the primary reference by providing a diverging element.

In response to the argument that Hodgson does not teach or suggest in any way the concept as embodied in the language of the independent claims: Appellant's argument has the basis that the reason for combining the Hodgson reference with WO'477 is not what appellant intended. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). In addition, the combination of WO'477 in view of Hodgson would inherently have the effect of blowing off the creep flow by the diverging return (recycle) flow, as stated in the rejection. Mere recognition of latent properties in the prior art does not render nonobvious an otherwise known invention. In *re Wiseman*, 596 F.2d 1019, 201 USPQ 658 (CCPA 1979) (Claims were directed to grooved carbon disc brakes wherein the grooves were provided to vent steam or vapor during a braking action. A prior art reference taught noncarbon disc brakes which were grooved for the purpose of cooling the faces of the braking members and eliminating dust. The court held the prior art references when combined would

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overcome the problems of dust and overheating solved by the prior art and would inherently overcome the steam or vapor cause of the problem relied upon for patentability by applicants. Granting a patent on the discovery of an unknown but inherent function (here venting steam or vapor) "would re-move from the public that which is in the public domain by virtue of its inclusion in, or obviousness from, the prior art." 596 F.2d at 1022, 201 USPQ at 661.); In re Baxter Travenol Labs., 952 F.2d 388, 21 USPQ2d 1281 (Fed. Cir. 1991) (Appellant argued that the presence of DEHP as the plasticizer in a blood collection bag unexpectedly suppressed hemolysis and therefore rebutted any prima facie showing of obviousness, however the closest prior art utilizing a DEHP plasticized blood collection bag inherently achieved same result, although this fact was unknown in the prior art.).

In response to the appellant's argument that Hodgson is "horizontal" whereas the claimed invention is "substantially vertical" (page 15, bottom paragraph of the brief): The motivation for combining the Hodgson reference with WO'477 is the conical impingement baffle, which is a known method to coalesce droplets from a gas stream, as taught by Hodgson, and has nothing to do with the horizontal orientation of the Hodgson system.. Moreover, Hodgson does not state anywhere that the structure has to be "horizontal" for the coalescing to happen.

In response to the appellant's argument that Hodgson reference is destroyed, or at the very least, making the combination would severely impair the Hodgson reference (page 16 of the brief): It is the WO'477 reference that is modified, not the Hodgson

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reference; therefore the question of destroying or impairing the Hodgson reference does not arise at all.

In response to the arguments in page 17 and 18 of the brief that WO is devoid of teaching for the axial obstruction and in Hodgson there is no recycle or return conduit, etc.: The lack of the axial obstruction in WO'477 was recognized in the rejection, which was the reason for the need for combining Hodgson with WO'477. Otherwise, WO'477 would have been an anticipatory reference. The absence of a return or recycle conduit in Hodgson is not commensurate in scope with the rejection either, because Hodgson was not used for any teaching of the return conduit. In response to the argument that the axial obstruction in Hodgson (conical baffle) is on the main conduit and not on a return conduit: It is not the location of the structure but the purpose of the structure that is motivating the combination. Whether it is the return conduit or the main conduit, the flow stream has liquid droplets, and the reason for the combination is that the axial obstruction in the flow stream would coalesce the droplets. In response to the argument that the liquid creep flow preventer is already present in the WO'477 teaching, and therefore, one of skill in the art would have no need to add a second such structure in the vertically oriented flow element: The reason for combining, again, is not for creep prevention, but for coalescing any remaining droplets of liquid in the gas stream.

II: Obviousness rejection of Claims 22-24 over WO'477 in view of Hodgson and further in view of WO 93/05339

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Appellant has not put forth any arguments against this rejection other than stating that the WO93/05339 reference does not overcome the deficiencies of the WO'477.

Claims 22-24 add the further limitation of a conical structure for the outlet of the device, which WO'477 in view Hodgson does not teach. WO'339 was used to overcome this deficiency, not any other deficiencies.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Patent Examiner  
8/19/05


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August 19, 2005

  
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